

B.E./B.Tech (Full Time) DEGREE END SEMESTER EXAMINATION, April / May 2019
CIVIL ENGINEERING BRANCH
END SEMESTER EXAM
FIFTH SEMESTER
(REGULATIONS 2012)
CE8503 – HIGHWAY ENGINEERING

Time : 3 Hours

Max Marks : 100

PART – A (10 x 2 = 20 Marks)

- 1) State the recommendations of the Jayakar Committee.
- 2) What are obligatory points and state their types with examples?
- 3) How will you attain superelevation in a divided carriageway?
- 4) Define Camber and state its types.
- 5) Draw the load distribution diagram for a flexible and Rigid pavement?
- 6) What are the types of axle loads considered in design of a rigid pavement?
- 7) What are the desirable properties of an aggregate and list the respective tests.
- 8) What is Tack Coat and Seal Coat. Why and where are they applied?
- 9) Define Pavement Management System.
- 10) Name the equipments used to assess the roughness of a pavement.

PART – B (5 x 16 = 80 Marks)

- 11a) Explain the engineering survey done to fix the alignment of a new Highway (16)
- 12a) i. With the help of a neat diagram, derive an expression for calculating the extra widening of roads on curves. (10)
- ii. Explain the methods of introducing extra widening on curves with and without provision of transition curves. (6)

(OR)

- 12b) Discuss with neat diagrams the classification of Urban roads based on location and function. (16)



- 13a) i. Design the Flexible Pavement for the construction of new highway with the following data: (8)
- | | |
|---|-------------|
| No of commercial vehicles as per last count | - 1500 CV; |
| Period of construction | - 3 years; |
| Design CBR of Subgrade soil | - 8%; |
| Traffic growth rate | - 7.5% |
| Vehicle Damage Factor | - 3.5 |
| Lane distribution factor | - 0.75 |
| Design life | - 15 years. |

- ii. Discuss in detail the components and functions of the different layers in a flexible pavement. (8)

(OR)

- 13b) Explain in detail the factors governing the design of a rigid pavement. (16)

- 14a) i. Explain the CBR method of testing the subgrade strength of soil. (8)

- ii. Discuss the types of materials used in the design of Bituminous and Concrete pavements. (8)

(OR)

- 14 b) Explain the following:

- i. Aggregate Impact Value test. (6)
- ii. Ductility test of Bitumen. (6)
- iii. Functions of Geotextiles. (4)

- 15a) Explain the following distresses in pavements:

- i. Alligator Cracks (6)
- ii. Potholes (6)
- iii. Edge cracks (4)

(OR)

- 15b) Discuss the following:

- i. Types of maintenances in pavements. (8)
- ii. Method of calculating Pavement Serviceability Index. (8)



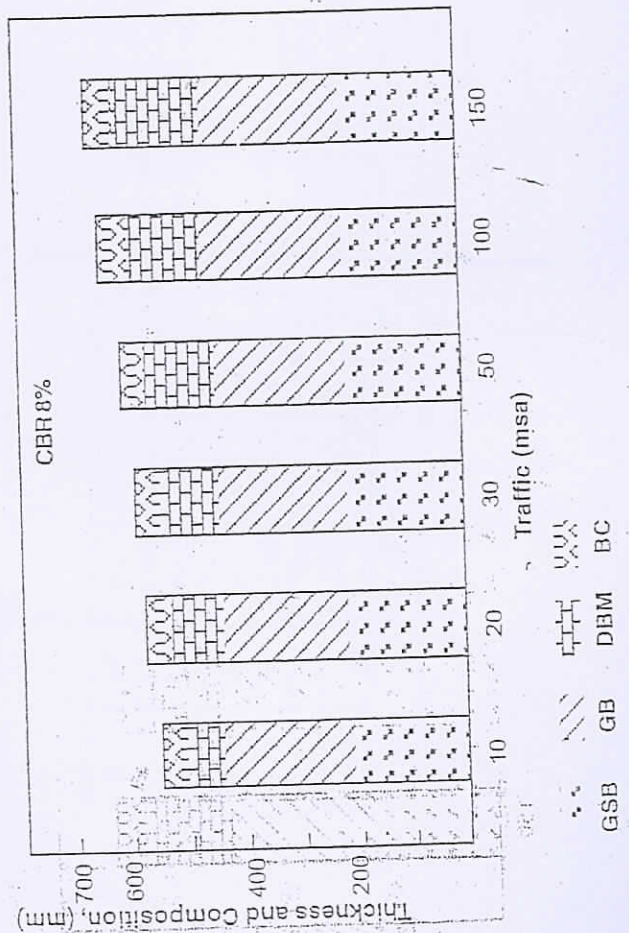


Pavement Design Catalogue

Recommended design for Traffic Range 10-150 msa

CBR 8%

Cumulative Traffic (msa)	Total Pavement Thickness (mm)	Pavement Composition		
		Bituminous Surfacing		Granular Base and Sub Base (mm)
		BC (mm)	DBM (mm)	
10	550	40	60	Base = 250
20	575	40	85	
30	590	40	100	Sub-base = 200
50	610	40	120	
100	640	50	140	
150	660	50	160	

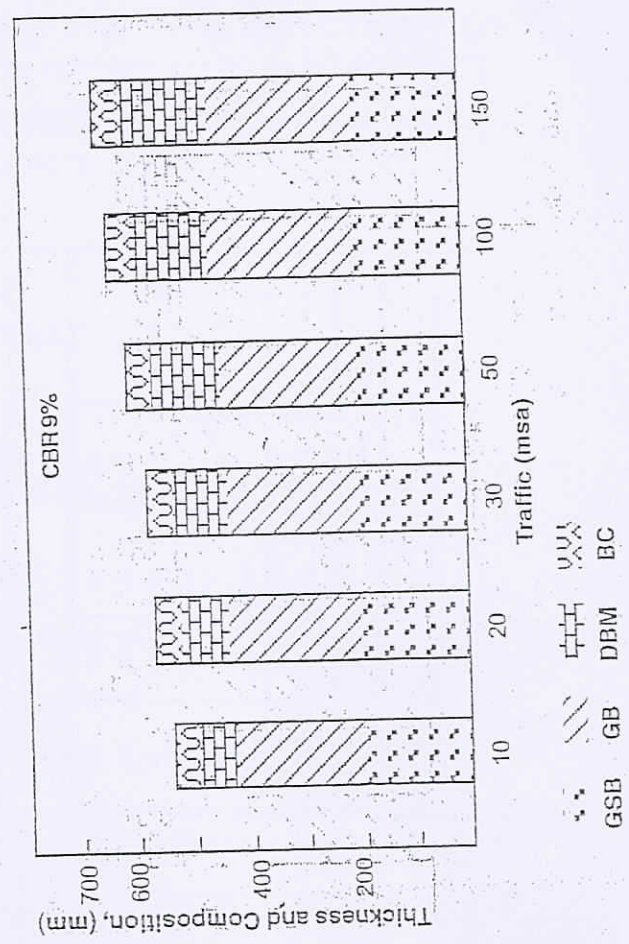


Pavement Design Catalogue

Recommended design for Traffic Range 10-150 msa

CBR 9%

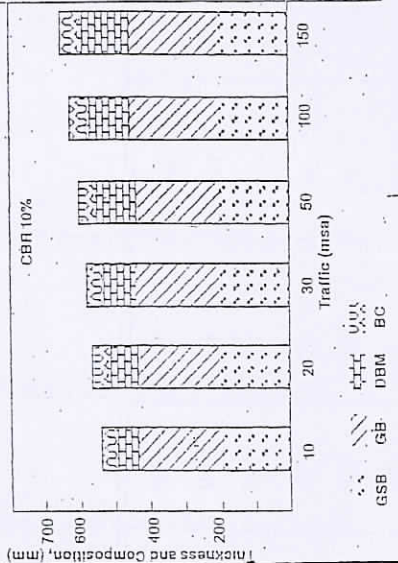
Cumulative Traffic (msa)	Total Pavement Thickness (mm)	Pavement Composition		
		Bituminous Surfacing		Granular Base and Sub Base (mm)
		BC (mm)	DBM (mm)	
10	540	40	50	Base = 250
20	570	40	80	
30	585	40	95	Sub-base = 200
50	605	40	115	
100	635	50	135	
150	655	50	155	





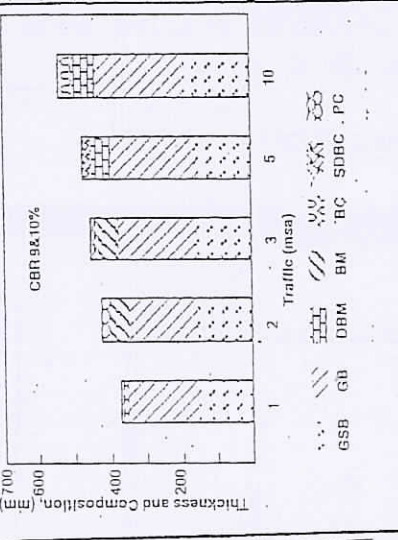
Pavement Design Catalogue
Recommended design for Traffic Range 10-150 msa
CBR 10%

Cumulative Traffic (msa)	Total Pavement Thickness (mm)	Pavement Composition		
		Bituminous Surfacing	Granular Base and Sub Base (mm)	
		BC (mm)	DBM (mm)	
10	540	40	50	Base = 250
20	565	40	75	
30	580	40	90	Sub-base = 200
50	600	40	110	
100	630	50	130	
150	650	50	150	



Pavement Design Catalogue
Recommended design for Traffic Range 1-10msa
CBR 9 & 10 %

Cumulative Traffic (msa)	Total Pavement Thickness (mm)	Pavement Composition			
		Wearing Course (mm)	Binder Course (mm)	Granular Base (mm)	Granular sub base (mm)
1	375	20 PC		225	150
2	425	20 PC	50 BM	225	150
3	490	20 PC	50 BM	250	150
5	475	25 SDBC	50 DBM	250	150
10	540	40 BC	50 DBM	250	200



Pavement Design Catalogue
Recommended design for Traffic Range 1-10msa
CBR 8%

Cumulative Traffic (msa)	Total Pavement Thickness (mm)	Pavement Composition			
		Wearing Course (mm)	Binder Course (mm)	Granular Base (mm)	Granular sub base (mm)
1	375	20 PC		225	150
2	425	20 PC	50 DBM	225	150
3	450	20 PC	50 BM	250	150
5	475	25 SDBC	50 DBM	250	150
10	550	40 BC	60 DBM	250	200

